WHAT DO TEACHERS DISCUSS DURING PARENT-TEACHER CONFERENCES? AND DOES IT MATTER FOR PARENTS' INVOLVEMENT IN CHILDREN'S LEARNING?

BY

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THESIS

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ABSTRACT

Parent-teacher conferences are considered an important link between home and school, but there are little data on what teachers discuss during these conferences and if it matters. Parent-teacher conferences ($N = 431$) with parents of young elementary school children (mean age = 7.69 years) were audio-recorded and coded. A subset of 255 parents reported on their involvement in children's learning 5 months later. Teachers mainly discussed children in the academic context, with little attention to the curriculum or parents' involvement in this context. Teachers concentrated less on math than literacy and adopted less of a process (e.g., strategies and motivation) orientation for math. Only teachers' process orientation appeared to contribute to parents' involvement: The more teachers adopted such an orientation, the more involved parents were 5 months later.

Keywords: family-school engagement; parent involvement; parent-teacher conferences

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BACKGROUND

What Do Teachers Discuss During Parent-Teacher Conferences?

And Does it Matter for Parents' Involvement in Children's Learning?

Parent-teacher conferences are considered an important bridge between home and school (e.g., Vickers, Minke, & Anderson, 2002). The large majority (90%) of parents of elementary school children attend such conferences in the United States (McQuiggan & Megra, 2017). Several investigators have suggested that when parents go to parent-teacher conferences, they acquire important information about children's learning in school, as well as useful strategies for engaging children in schoolwork (e.g., Hill & Taylor, 2004; Pomerantz & Grolnick, 2017). As a result, parents may feel more efficacious in supporting children's learning, leading them to be more engaged in children's education, which then facilitates children's academic adjustment—that is, motivation, engagement, and achievement (for a review, see Pomerantz, Kim, & Cheung, 2012). However, teachers often receive little training in how to conduct parent-teacher conferences (Lawrence-Lightfoot, 2004; Lazar, Broderick, Mastrilli, & Slostad, 1999; Lemmer, 2012), likely due to the dearth of empirical evidence on best practices for parent-teacher conferences.

The current research took a step toward addressing this lacuna. In doing so, it diverged from the few studies conducted to date on parent-teacher conferences, which have generally examined teachers' cultural sensitivity or interpersonal skills (e.g., Cheatham & Ostrosky, 2013; García-Sánchez, Orellana, & Hopkins, 2011; Pillet-Shore, 2016; for an exception, see Minke & Anderson, 2003). Although such a focus on teacher sensitivity is critical to understanding how teachers can develop constructive partnerships with parents, it does not yield insight into whether teachers regularly provide information useful to parents in supporting children's learning. Thus, the first aim was to elucidate the information teachers provide during parent-teacher conferences

in regards to (1) children, (2) the curriculum, and (3) parents' involvement in the academic context. Attention was also given to the subject (i.e., math vs. literacy) of such information and teachers' process (e.g., strategies and motivation) and outcome (e.g., grades and test scores) orientation. The second aim was to identify whether the three types of information (i.e., children, the curriculum, and parents' involvement) and the two orientations (i.e., process and outcome) contribute to parents' involvement in children's learning.

Parent-Teacher Conferences

Parent-teacher conferences are what Bronfenbrenner (1979) labels a mesosystem in that they are comprised of the interconnection between the home and school microsystems. Although Bronfenbrenner viewed mesosystems as just as likely as microsystems to influence children's academic adjustment, they have received far less theoretical and empirical attention than microsystems. Indeed, the role of parents' and teachers' practices in children's academic adjustment have each been the major focus of substantial theory and research (for reviews, see Patrick, Mantzicopoulos, & Sears, 2012; Pianta, Hamre, & Allen, 2012; Pianta, Hamre, & Stuhlman, 2003; Pomerantz et al., 2012), but this is not the case for parent-teacher conferences. As one of the main interactions parents have with teachers (Vickers et al., 2002), parent-teacher conferences represent a major mesosystem in which teachers and parents can communicate to establish a shared understanding of how to support children's learning.

Parent-teacher conferences in the United States typically take place two to three times a year, with each conference lasting approximately 15 to 20 minutes. These conferences are well attended by families of diverse socioeconomic status. Although more educated parents (i.e., beyond a high school diploma) are more likely to attend parent-teacher conferences (76% to 84%), a large proportion of less educated families (70% to 73%) attend such conferences (McQuiggan & Megra, 2017). There is also little difference in attendance as a function of

children's ethnicity (e.g., 79% of families of both white and black children attend parent-teacher conferences; McQuiggan & Megra, 2017). Thus, in the context of parent-teacher conferences, teachers have the potential to reach a large number of families from a range of backgrounds.

What Type of Information Do Teachers Provide During Parent-Teacher Conferences?

Advice to teachers indicates that one of the central goals of parent-teacher conferences is to provide information to parents about *children* in the academic context (e.g., Harvard Family Research Project, 2010; Price & Marsh, 1985). Such information may be useful to parents in determining how to best help children in school (Ames, Khoju, & Watkins, 1993; Ames, Stefano, Watkins, & Sheldon, 1995; Sirvani, 2007). Information about the *curriculum* may also be important to parents' engagement in children's education. When teachers communicate achievement standards and expectations (e.g., children should be able to quickly multiply single digit numbers), along with information about the types of assignments and work children do in class to meet the standards, parents may be more equipped to support children's learning (e.g., Hill & Taylor, 2004). Teachers are also advised to provide guidance on *parents' involvement* (e.g., suggest parents quiz children on math facts or give tips on how parents can help children with reading) during parent-teacher conferences (e.g., Simmons, 2002). Importantly, the more parents report teachers as inviting them to be involved in children's learning, the more efficacious they feel about helping children and the more involved they are (e.g., Epstein, 1987; Green, Walker, Hoover-Dempsey & Sander, 2007).

To date, there has been little if any attempt to quantify the different types of information teachers provide during parent-teacher conferences. The one exception is Minke and Anderson's (2003) study of 199 parents of elementary school children and their teachers. Parents in this study viewed teachers as providing substantial information about children academically. Practically all parents reported that teachers gave at least "some" information on children in the

academic context, with the majority (77%) indicating that teachers gave "a lot" of information. Although Minke and Anderson did not ask parents about curriculum information, during in-depth interviews, teachers indicated that such information (e.g., their expectations for children and classroom procedures) was particularly important to convey during parent-teacher conferences. When it came to providing guidance about parents' involvement, 93% of parents said teachers gave at least "some" ideas for helping children, with about half (47%) saying teachers provided "a lot" of ideas.

Although Minke and Anderson's (2003) study is an important first step toward understanding what information teachers provide during parent-teacher conferences, further investigation is needed. Minke and Anderson relied on parents' and teachers' reports, which although likely based in reality, may also include a variety of biases. For example, parents' positive impression of teachers may influence their reports. Interviews with teachers may get at their intentions (e.g., to provide curriculum information), but teachers may not always follow through on their intentions. Moreover, it is unclear whether variation in the information provided by teachers reflects between-teacher variation (e.g., due to their beliefs or experience) or within-teacher variation (e.g., due to children's or parents' characteristics). Distinguishing the two may be important in terms of supporting teachers in optimizing their parent-teacher conferences. For example, if some of the variation is due to differences between teachers in their general approach to parent-teacher conferences (e.g., provision of parent involvement information) and such variation is meaningful (e.g., it has implications for parents' involvement), then teachers' general approach is an important target for training.

There has also not been attention to the orientation of the information teachers provide. Most teachers will spend at least some time discussing outcomes such as children's grades or test scores during parent-teacher conferences. However, teachers may vary in the extent to which

they adopt an *outcome orientation* with some teachers simply conveying the essentials of where children are in terms of the achievement standards for their grade and other teachers going into great detail about children's grades and test scores (e.g., reviewing grades and scores for every skill involved in literacy). Teachers may also vary in the extent to which they adopt a *process orientation* in which they elaborate on the process of children's learning via provision of specifics (e.g., strategies, motivation, and effort) and explanations for why children may be struggling or doing well. Such information may not only convey that children can grow their abilities through effort and other means, but also provide information about what parents should target in helping children do so.

Do Teachers Focus Similarly on Math and Literacy During Parent-Teacher Conferences?

Math and literacy are the two major areas of learning during the elementary school years. More school hours are devoted to these two subjects than others such as social studies and science (Banilower et al., 2013). In addition, report cards often focus more heavily on children's performance in math and literacy than other subjects, with annual testing focusing almost exclusively on math and literacy during the elementary school years. Teachers' provision of information about math may be particularly important for parents given that parents are considered an underutilized resource in children's math learning (e.g., Harackiewicz, Rozek, Hulleman, & Hyde, 2012) in part because they devote less time and energy to supporting children's learning in math than literacy (Cannon & Ginsburg, 2008), with some parents suffering from math anxiety that can disrupt their support of children's learning in this area (e.g., Maloney, Ramirez, Gunderson, Levine, & Beilock, 2015).

When children are in elementary school, however, teachers may devote less time to discussing math than literacy during parent-teacher conferences as children spend a smaller proportion of the day on math (54 minutes on average) than literacy (89 minutes on average;

Banilower et al., 2013). In addition, teachers may not feel entirely comfortable talking with parents about math, which may affect the quantity and quality of their discussion of math. Elementary school teachers often have less knowledge about math than literacy and feel more anxious about math. Only 10% of American elementary school teachers who provide math instruction take courses in all five recommended areas of math in college (Banilower et al., 2013). It is thus not surprising that elementary education majors score the highest on math anxiety among seven different college majors (Hembree, 1990). More teachers report at least some basic level of familiarity with literacy (91% to 92%) than math (78% to 81%) standards (Editorial Projects in Education Research Center, 2013). In addition, most (90%) teachers in American public elementary schools are women (Taie & Goldring, 2018), and thus targets of the prevalent gender stereotype that females do not have the talent required for math (e.g., Nosek et al., 2009; Spencer, Steele, & Quinn, 1999; Steffens, Jelenec, & Noack, 2010).

Elementary school teachers' anxiety about math may lead them to keep their provision of information to a minimum. Thus, when it comes to math, they may simply tell parents how children are doing in terms of grades, test scores, or other performance indicators. Their process orientation may be minimal as they elaborate nominally, if at all, on children's learning—for example, they may not give detailed explanations about why children are doing well or poorly in math. The societal view that natural talent is particularly important to math (e.g., Leslie, Cimpian, Meyer, & Freeland, 2015; Meyer, Cimpian, & Leslie, 2015) may also detract from teachers' process orientation in math as they do not see it as something that can be improved substantially by strategies or effort. The lack of process orientation in regard to math (vs. literacy) may convey to parents that math ability is something that cannot be acquired with effort or other means, which may ultimately undermine children's learning in math (e.g., Gunderson et al., 2018; Pomerantz & Kempner, 2013).

Does Teachers' Communication Contribute to Parents' Involvement?

Although teachers and parents often communicate outside of parent-teacher conferences, such conferences provide a unique opportunity for teachers to provide parents with information that allows parents to optimally support children's learning (e.g., Pomerantz & Grolnick, 2017). When teachers discuss children in the academic context with parents, parents may learn with what children are having difficulty and where to target their efforts. When teachers' discussion of children is process oriented, it may help parents understand not only with what children are having difficulty, but also why. Parents may feel that children can grow their ability via effort and other means, while also gaining knowledge about what to target in supporting children. As a consequence, teachers' process orientation may increase parents' efficacy for helping children, which has repeatedly been linked to heightened involvement in children's learning among parents (e.g., Epstein & Dauber, 1991; Green et al., 2007; Hoover-Dempsey & Sandler, 1995; Hoover-Dempsey & Sandler, 1997).

Other types of information may also heighten parents' involvement. When teachers discuss the curriculum, parents may develop an understanding of what and how children are learning, which may enhance their efficacy for helping children. Teachers' provision of guidance about specific practices that parents can use with children may also build parents' efficacy (e.g., Pomerantz & Grolnick, 2017). Moreover, such information may be interpreted as an invitation to be involved (e.g., Epstein, 1987), which is associated with heightened involvement among parents (e.g., Green et al., 2007). All three forms of academic information (i.e., child, curriculum, and parent involvement), along with a process orientation, may be particularly useful in fostering parents' involvement when they have children who are doing poorly in school (e.g., Epstein, 1986) as these parents may feel less efficacious in supporting the learning of such children unless they know what the issues are and what to do to address them.

Overview of the Current Research

There current research had two key aims. The first was to provide information about what teachers discuss during parent-teachers conferences. We examined variation both within and between teachers, exploring whether the type of information teachers provide varies as a function of family characteristics such as children's achievement and parents' educational attainment. The second aim was to identify if what teachers discuss matters for parents' subsequent involvement, with attention to the possibility that this may be particularly important when children are struggling in school. The research focused on parent-teacher conferences when children were in early elementary school (i.e., first, second, and third grades) because this is a time when parents are most likely to attend such conferences (McQuiggan & Megra, 2017), which may mean that parent-teacher conferences have particularly wide-reaching effects. In addition, many parents may be building their knowledge about their children in the academic context, as well as how schools operate in terms of the curriculum and how to best be involved in children's learning.

The first parent-teacher conferences of the academic year were audio-recorded. The content of teachers' communications was coded in regards to the amount of information teachers provided about (1) children, (2) the curriculum, and (3) parents' involvement in the academic context (i.e., math and literacy). Teachers' process and outcome orientations were also coded. We examined whether family characteristics (e.g., children's performance in school and parents' educational attainment) contributed to variation in the content of teachers' communications. Approximately five months following the parent-teacher conferences, a subset of parents completed a survey assessing their involvement in children's learning permitting investigation into whether teachers' communications contribute to such involvement and if this is moderated by children's performance in school.

METHOD

Participants

Participants were 431 families and 52 teachers of first, second and third grade children (mean age = 7.68 years, *SD* = 1.16; 46% girls) from 14 elementary schools in the Midwestern United States. These schools served a substantial proportion of low-income families (*M* = 69%, *SD* = 22%). Slightly more than half of the children were European American (60%); 27% were African American, 3% were of Latinx descent, 3% were of Asian descent, and 7% were another or mixed ethnicity. Two-hundred-and-fifty-five of the participating parents (83% mothers) completed a survey in which they reported on their involvement in children's learning. Of the 97% of these parents who provided information on their highest level of educational attainment, 27% had an advanced degree (e.g., MA or PhD), 30% had a college degree, 15% had an associate's degree, 26% had a high school diploma, and 2% had less than a high school diploma. Families with parents completing the survey were fairly similar to the larger sample in terms of ethnicity in that children (43% girls) were largely (66%) European American, with 19% being African American; the remaining 15% were another or mixed ethnicity. Conferences were mostly attended by parents. Mothers were almost always present (93%), and fathers were present less than half of the time (42%).

Of the 102 teachers invited to participate, 52 participated. Almost all (96%) of the participating teachers were women, which is close to the national average for teachers in public elementary schools (90%; Taie & Goldring, 2018). Nineteen of the participating teachers taught first grade, 12 taught second grade, 19 taught third grade, and two taught more than two grades (i.e., one taught both first and second grade and the other taught both second and third grade). Eighty-five percent of the teachers were European American, 8% were African American, and 8% were another or mixed ethnicity. The highest educational degree for about half (54%) of the

teachers was a college degree, with the remaining half (46%) holding a master's degree. All the teachers, except one, had an education-related degree. Teachers varied in how long they had taught, ranging from one to 44 years, with a median of nine years (M = 11.75, SD = 9.35). On average, each teacher had 8.29 (SD = 3.10) families in their class who allowed their conferences to be audio recorded, which ranged from approximately a third to more than half of families in classes with participating teachers.

Procedure

The first parent-teacher conferences of the year were audio-recorded. These generally took place in late October or early November, depending on the school's schedule. Conferences were scheduled to last 15 min and generally lasted for the full time (M = 14 min, 40 sec; SD = 5 min, 18 sec). Because parent-teacher conferences are often considered private and valuable by both parents and teachers, the recording procedure was designed to be as unobtrusive as possible. Research personnel were stationed outside the classrooms of participating teachers. When parents arrived for their conference, if they had not already signed up to participate in the project via information sent home by the teacher, they were invited to participate. Participating parents were given a small digital audio recorder, which was already on. Parents set the recorder in a predetermined place in the conference area for the duration of the conference. They returned it to the research assistant immediately after their conference. The following spring, all participating parents were invited to complete a survey on their involvement in children's learning. The procedures were approved by the [UNIVERSITY BLINDED FOR REVIEW] Institutional Review Board (IRB Protocol #: 13011).

Measures

Teachers' communication. Two trained coders rated the content (e.g., information on children in the academic context) of teachers' communications to parents as well as their process

and outcome orientation (for the coding scheme, see Table 1). For each dimension the coders rated, they noted examples while listening to each parent-teacher conference to ensure their ratings were based on concrete evidence; they made each rating (1 = *Not at all – never*, 5 = *Very much – very frequently*) immediately after listening to each conference. The frequency (i.e., how often a particular dimension of communication occurred), duration (e.g., how long the dimension of communication occurred), and representativeness (i.e., how similar the communication was to the type of communication being coded) of teachers' communications were taken into account in the coding. The coders met weekly to discuss any disagreements in their ratings on the scales to come to a consensus on the final score and ensure continued understanding of the coding system.

Content. Three dimensions of the content of teacher's communications were rated separately for math and literacy. Teachers' communications about *children* in the academic context reflected the amount of information they provided in terms of children's performance, behavior, and other attributes (e.g., performance on achievement tests, grades, and teachers' observations of work; "her scores were perfect on the math assessment" "he has trouble with comprehension") in math (ICC = .93) and literacy (ICC = .88). Teachers' provision of *curriculum* information was comprised of their descriptions of the types of problems, assignments, or activities children do, as well as expectations and standards for children's skill development or performance (e.g., "we do timed tests for basic mathematical operations" "by the end of the year, we expect children to be reading these kinds of books") in math (ICC = .94) and literacy (ICC = .91). Teachers' discussion of *parent involvement* included suggestions about what parents can do to promote children's learning. This included general advice about parents' involvement (e.g., "yes, you need to be firm on the rules with him"), use of specific practices (e.g., "you can have him do five minutes of independent reading a day"), and direction to

resources (e.g., “you can use this website that gives quizzes on subtraction”) in math (ICC = .94) and literacy (ICC = .95).

Orientation. The extent to which teachers’ discussion of children was process or outcome oriented was coded globally—that is, across math and literacy—given that in preliminary coding, it was difficult to code orientation separately for the two subjects. Thus, we addressed the issue of process and outcome orientation in math versus literacy analytically (see Results). Teachers’ *process orientation* included their provision of specifics about children’s learning and explanations about why children may be succeeding or struggling (ICC = .91). It involved accounts of children’s skills, performance, and strategies (e.g., “she is a quick reader, but she doesn’t always stop to ensure she understands”), as well as motivation, effort, and other behavior (e.g., “his math is not as good as it could be, because he is easily distracted by other children”). Teachers’ *outcome orientation* reflected teachers’ references to children’s outcomes such as grades or test scores (ICC = .94). Both relative (e.g., “when it comes to reading, she is probably the most advance student in the class”) and absolute (e.g., “he got an A in math and a C in reading”) outcome descriptions were included.

Parents’ involvement. Parents’ involvement in children’s learning was assessed in the spring approximately five months after the parent-teacher conferences with 10 items modified slightly from previous measures of parents’ involvement (Cheung & Pomerantz, 2011; Kohl, Lengua, & McMahon, 2000). For each item, parents indicated the frequency of their involvement in children’s learning (1 = *never*, 5 = *very often*). The items covered three key areas: (1) discussion of learning in school with children (e.g., “My child and I talk about things she is learning in school” “I start conversations with my child about how his schoolwork is going”), (2) engagement in learning activities or schoolwork with children at home (e.g., “I help my child with her schoolwork when she asks” “I play games related to learning with my child”), and (3)

involvement on the school front (e.g., “I volunteer at my child’s school” “I check in with my child’s teacher—for example, by email or stopping by the classroom”). The mean of the ten items were taken, with higher numbers reflecting greater involvement ($\alpha = .81$).

Children’s grades. Children’s grades in math and literacy for the first quarter of the school year were collected from school records although not every school provided such records, such that the information was available for only 309 participants. Teachers distributed report cards with these grades during the fall parent-teacher conferences and often focused on these grades during the conferences. School districts varied in how they assigned grades such that there were differences in the specific skills for which children received grades (e.g., some school districts gave a grade for counting, whereas others did not). The symbols also varied (e.g., some school districts used symbols such as “P” for making progress and “M” for meeting standards, whereas others used the traditional “A”, “B”, “C”). To address this variation, each grading system was converted to a 5-point numerical system (1 = *F or significantly below grade level*, 5 = *A or significantly above grade level*). Subsequently, for each subject, the mean of the specific skill areas was taken so that each child had a composite grade for math and one for literacy. The mean of the two subjects was then taken, such that higher scores reflect higher grades.

RESULTS

We conducted two central sets of multilevel model (MLM) analyses using HLM 7 (Raudenbush, Bryk, Cheong, Congdon, & Du Toit, 2011). MLMs are necessary given the nested structure of the data with each teacher holding multiple conferences and providing information about both math and literacy. The first central set of analyses focused on giving a descriptive picture of teachers' information provision during parent-teacher conferences. The second central set of analyses evaluated if teachers' information provision is predictive over time of parents' involvement in children's learning.

What Type of Information Do Teachers Provide?

To identify the nature of teachers' information we conducted several sets of MLM. First, we examined the extent to which teachers provided child, curriculum, and parent involvement information in the academic context. Second, we explored the extent of their process and outcome orientation. Third, we compared the extent to which teachers focused on math versus literacy when discussing children, the curriculum, and parent involvement. We also evaluated if teachers' discussion of children in math and literacy are differentially associated with their process and outcome orientation. Fourth, we compared within- and between-teacher variance in teachers' information provision and explored whether family characteristics contribute to the variance.

Child, curriculum, and parent involvement information. To determine the extent to which teachers provided information about children, the curriculum, and parents' involvement, we ran three empty 3-level models—one for each type of such information (see Model 1 in Appendix A). Each type of information (*i*; i.e., child, curriculum, or parent involvement) about math or literacy (Level 1) was nested within an individual conference (*j*) attended by a particular family (Level 2) with a particular teacher (*k*; Level 3); the information was modeled as a function

of the average amount of that type of information across all conferences (γ_{000}) with variance terms at all three levels (e_{ijk}, r_{0ij}, u_{00k}).

There were only two conferences where the teacher did not discuss children in the math and literacy learning context at all. In the majority of conferences (80%), teachers talked about children at least somewhat in one or both of the subjects (i.e., a 3 or above on the rating scale; see the fixed effects in Table 2), γ_{000} = 2.67, *SE* = .05. Teachers provided information about the curriculum, γ_{000} = 1.56, *SE* = .04, and parent involvement, γ_{000} = 1.50, *SE* = .04, in the two subjects far less frequently. In more than half (55%) of the conferences, curriculum and parent involvement were discussed only a little bit (i.e., a 2 on the rating scale) for at least one subject, with about 1% of the conferences addressing these topics more than somewhat (i.e., a 4 or above on the rating scale).

Process and outcome orientation. To examine the extent to which teachers' information about children was process and outcome oriented, we ran two empty 2-level models—one for each orientation—identical to the 3-level models described above, but because orientation was not coded by subject, the subject level was omitted. On average teachers were moderately process (γ_{00} = 3.03, *SE* = .05) and outcome (γ_{00} = 2.77, *SE* = .10) oriented. It was quite rare that teachers' were not process oriented at all (i.e., only 2% of teachers were rated at 1 on the rating scale), with most of the teachers being a little bit (i.e., a 2 on the rating scale; 21%), somewhat (a 3 on the rating scale; 53%), or a good deal (a 4 on the rating scale; 22%) process oriented. Fourteen percent of teachers were not at all outcome oriented (i.e., rated a 1 on the rating scale) with the majority of teachers being a little bit (28%), somewhat (33%), or a good deal (17%) outcome oriented.

Math and literacy. The next set of analyses compared the extent to which teachers discuss math versus literacy when providing child, curriculum, and parent involvement

information. To this end, we ran 3-level models for each of the three types of information, where the amount of information (*i*) when discussing children, curriculum, or parent involvement (Level 1) in a conference (*j*; Level 2) with a teacher (*k*; Level 3) was modeled as a function of the average amount of information (γ_{000}) and the dummy variable *subject* (0 = literacy, 1 = math) Level 1 (γ_{100}) with variance terms (e_{ijk}, r_{0ij} and u_{00k}; see Model 2 in Appendix A). As shown in Figure 1 (see also Table 2), teachers provided less information about math than literacy in their communications with parents during parent-teacher conferences. The subject difference was significant for information about children, γ_{100} = -.80, *SE* = .07, *t*(378) = -11.86, $p < .001$, the curriculum, γ_{100} = -.40, *SE* = .04, *t*(378) = -8.98, $p < .001$, and parent involvement, γ_{100} = -.35, SE = .04, *t*(378) = -8.29, $p < .001$.

To test the idea that teachers may be less process-oriented when discussing children in math as compared to literacy, we examined if the associations between teachers' provision of information about children and their process and outcome orientation differed with subject. To directly compare teachers' process and outcome orientation when discussing children in math versus literacy, we used the dummy variable *subject* (0 = literacy, 1 = math) and examined its interaction with group-centered process or outcome orientation at Level 1 in predicting teachers' provision of information about children—models for each orientation were evaluated separately (see Model 3 in Appendix A).

The MLM indicated that teachers were more process oriented the more they discussed children in the academic context, γ_{010} = .45, *SE* = .05, *t*(51) = 8.99, $p < .001$. Importantly, as anticipated, this was moderated by subject, γ_{110} = -.31, *SE* = .07, *t*(51) = -4.55, $p < .001$. As shown in Table 3, the association between teachers' discussion of children and their process orientation was stronger for literacy than math. It was also the case that teachers were more outcome oriented the more they discussed children, γ_{010} = .21, *SE* = .03, *t*(51) = 6.21, $p < .001$,

but this association did not differ for math versus literacy, γ_{110} = -.07, *SE* = .05, *t*(51) = -1.43, *p* = .16.

Within- and between-teacher variability. As shown in Table 2 (see random effects), the majority of variance in regards to how much teachers discuss each of the three types of information (i.e., child, curriculum, and parent involvement information) was due to whether teachers were talking about math or literacy (i.e., the Level-1 error), *e*s = .66, .39, and .36, *SE*s = .03, .02, and .02. Beyond this, the within-teacher variance between conferences (i.e., Intercept variance at Level 2), r_0s = .00, .06, and .05, *SE*s = .00, .01, and .01, and between-teacher variance (i.e., Intercept variance at Level 3), u_{00}s = .09, .04, and .07, *SE*s = .04, .03, and .04, were relatively small but similar. The bulk of the variance was within teachers for their process, *r* = .53, *SE* = .04, and outcome, *r* = .81, *SE* = .04, rather than between-teachers, u_0s =. 08 and .47, *SE*s = .04 and .09, for process and outcome orientation, respectively; however, both were fairly sizeable.

The next set of analyses focused on identifying whether teachers' information provision may vary as a function of family characteristics. First, it is possible that teachers may discuss children's math more with parents of children in higher (versus lower) grades, as the Common Core standards emphasize increased engagement in math in later than earlier years of school (National Governors Association Center for Best Practices & Council Chief State School Officers, 2010). Thus, we added grade level at the teacher level (Level 3) to the models as grade level varies between teachers given that each teacher has a classroom of a single grade; for the two teachers who taught more than one grade in a single classroom, their grade level was assigned based on which grade had more students enrolled in the study (see Model 4 in Appendix A). Neither teachers' provision of child or curriculum information varied with children's grade level, γ_{001}s = -.11 and -.02, *SE*s = .08 and .05, $|t|$(50)s < 1.50, *p*s > .14; the

difference in their provision of such information in math versus literacy also did not vary with children's grade level, γ_{101} = .07 and -.04, *SE* = .08 and .05, $|t|(377)$s < .89, *p*s > .38. However, teachers provided less parent involvement information to parents of older (vs. younger) children, γ_{001} = -.14, *SE* = .05, $t(50) = -2.90$, $p < .01$, but as shown in Figure 2, this was moderated by subject, γ_{101} = .10, *SE* = .04, $t(377) = 2.27$, $p < .05$: Teachers provided less parent involvement information in regards to literacy to parents of older (vs. younger) children, slope coefficient = -.14, *SE* = .05, $p < .01$, but such a trend was not evident in math, slope coefficient = -.03, *SE* = .05, $p = .48$.

Second, given gender stereotypes about girls' and boys' competence in math and literacy (e.g., Preckel, Goetz, Pekrun, & Kleine, 2008), it is also possible that the difference in teachers' tendency to talk about math versus literacy is moderated by children's gender (e.g., they discuss math more with parents of boys than parents of girls). To examine this possibility, we added gender (0 = female, 1 = male) to the family level (Level 2) of the models examining the subject effects (see Model 5 in Appendix A). Teachers' provision of child, curriculum, and parent involvement information did not vary with children's gender, γ_{010}s = .00 to .04, *SE*s = .07 to .08, $|t|(51)$s < .49, *p*s > .62, nor did the difference in their provision of such information in math versus literacy, γ_{110}s = -.05 to .03, *SE*s = .08, $|t|(51)$s < .57, *p*s > .57.

Third, it is possible that teachers may vary in their provision of information to parents based on other characteristics such as parents' educational attainment and children's achievement—for example, teachers may provide more information to parents when children are struggling. To examine this possibility, we added parents' educational attainment (0 = less than a bachelor's degree, 1 = bachelor's degree, 2 = higher than a bachelor's degree) and children's grades to the family level (Level 2), with separate models for each of these possible moderators (see Model 5 in Appendix A). Teachers' information provision did not vary with either parents'

educational attainment, γ_{010}s = -.02 to .02, *SE*s = .04 to .07, |*t*|(49)s < .46, *p*s > .65, or children's grades, γ_{010}s = -.11 to .04, *SE*s = .13 to .14, |*t*|(39)s < .78, *p*s > .44. Moreover, the differences in teachers' information provision in math and literacy did not vary with these two family characteristics—parents' education attainment, γ_{110}s = -.02 to -.00, *SE*s = .06 to .09, |*t*|(49)s <.34, *p*s > .73, and children's grades γ_{110}s = -.21 to -.05, *SE*s = .15 to .16, |*t*|(39)s < 1.36, *p*s > .18.

We examined whether teachers' orientations vary as a function of children's grades, gender, or grade level, as well as parents' educational attainment. Adding such family characteristics to the two-level models for teachers' process and outcome orientation, children's grades in school and gender were significant predictors. The higher children's grades, the less teachers' discussion of children was process oriented, γ_{10} = -.45, *SE* = .15, *t*(39) = -2.98, *p* < .01, and the more it was outcome oriented, γ_{10} = .44, *SE* = .13, *t*(39) = 3.34, *p* < .01. Teachers were more processed oriented for boys than girls, γ_{10} = .18, *SE* = .08, *t*(51) = 2.18, *p* < .05, but their outcome orientation did not vary with children's gender, γ_{10} = .03, *SE* = .07, *t*(51) = .44, *p* = .66. Neither orientation varied by children's grade level or parents' educational attainment, |*t*|s < .98, *p*s > .33.

Does Teachers' Provision of Information Contribute to Parents' Involvement?

The second major set of analyses focused on the contribution of teachers' provision of information to parents' later involvement in children's learning. The analyses were conducted with two-level models in which parents' involvement for a particular family (*i*; Level 1) who received information from a particular teacher (*j*; Level 2) is modeled as a function of the average amount of involvement (γ_{00}) and the information provided by the teacher (γ_{10}; e.g., parent involvement information) group-centered at Level 1 with error terms (r_{ij}, u_{0j} and u_{1j}), with each type of information examined in a separate model (see Model 1 in Appendix B). Contrary

to expectations, teachers' provision of information (averaged across math and literacy) about children, γ_{10} = .00, *SE* = .07, *t*(49) = .06, *p* = .96, the curriculum, γ_{10} = .06, *SE* = .07, *t*(49) = .81, *p* = .42, and parent involvement, γ_{10} = -.09, *SE* = .06, *t*(49) = -1.50, *p* = .14, did not predict parents' involvement five months later, and this did not vary with children's grades in school (see Model 2 in Appendix B), γ_{30}s = -.17 to .30, *SE*s = .12 to .26, |*t*|(37)s < 1.34, *p*s > .18.

As anticipated, however, the more process oriented teachers were in their discussions with parents, the more involved parents were five months later, γ_{10} = .09, *SE* = .04, *t*(49) = 2.06, *p* < .05. Because teachers' process orientation varied with children's gender (see above), we included gender as Level-1 predictor; the link was still evident, γ_{20} = .10, *SE* = .04, *t*(49) = 2.26, *p* < .05. Teachers process orientation also varied with children's grades, but teachers' process orientation predicted parents' involvement when children's grades were included at Level 1, γ_{20} = .09, *SE* = .05, *t*(37) = 1.98, *p* = .055. Moreover, the link was not moderated by children's grades, γ_{30} = -.14, *SE* = .17, *t*(37) = -.82, *p* = .42. Teachers' outcome orientation was not predictive of parents' later involvement on its own, γ_{10} = -.02, *SE* = .05, *t*(49) = -0.43, *p* = .67, or in conjunction with children's grades, γ_{30} = -.09, *SE* = .12, *t*(37) = -.79, *p* = .44.

Supplementary Analyses: Content of Parent Involvement Information

It was particularly surprising that teachers' provision of parent involvement information did not predict involvement among parents. Pomerantz and Grolnick (2017), however, suggest that teachers need to consider the content and style of their invitations to parents for involvement if they want them to be successful. Teachers devoted a relatively small proportion of their conferences to providing parent involvement information (see Figure 1), which may have led such information to be ineffective. Moreover, teachers may not have elaborated enough when providing parent involvement information. For example, teachers may not have tailored their

suggestions to the needs and interests of children; or they may not have explained why the practices they suggested are useful. As a consequence, children may not have been receptive to parents' involvement attempts and parents may not have persisted in being involved.

We examined the content of the information teachers provided about parent involvement. For the 278 parent-teacher conferences that were rated as having any parent involvement information (i.e., above a 1 on the 5-point scale), all instances in which teachers referenced parent involvement were transcribed and coded. Because both quantity and quality of parent involvement are important for children's learning (e.g., Pomerantz, Moorman, & Litwack, 2007), we coded type and quality of involvement practices (for the coding scheme, see Table 4). *Practice type* included parent involvement information focused on concrete practices parents can implement or resources they can use: (1) provision of materials, (2) practice, (3) parent persistence, (4) rewards, and (5) punishment. *Practice quality* included information focused on issues of parents' sensitivity in terms of teachers suggesting (1) autonomy support in the involvement context, (3) acknowledging children's negative states while doing schoolwork, and providing advice to parents tailored to (3) children's problem(s) or (4) their interests or personality. Across the two broad dimensions of type and quality, we coded whether teachers provided a rationale (e.g., explained why a practice is useful). Pairs of trained coders coded teachers' parent involvement information transcriptions. Coders could put information into more than one category if a transcription included multiple types of suggestions (κs = .84 - .94); coders met weekly to resolve disagreements.

As shown in Table 4, teachers most frequently recommended specific practices or resources. In about two-thirds (67%) of the cases in which teachers provided parent involvement information, they referred parents to materials (e.g., a list of sight words to practice) or resources (e.g., a website for math activities). Teachers also emphasized practice (e.g., highlighting

repeated reading) as a key to learning to almost half of (44%) parents with whom they discussed parent involvement. Teachers referenced the quality of involvement practices far less frequently. Although teachers tailored their involvement information to children's issues or problems (e.g., providing a list of reading comprehension questions to ask child to improve upon below average reading performance) to 40% of families with whom they discussed parent involvement, they rarely tailored such information to children's interests or personalities (11%; e.g., suggesting animal storybooks to improve reading skills given a child's interest in animals). Other references to involvement quality such as suggesting autonomy support (e.g., telling parent to let children try problems on own before instructing child) and acknowledging children's negative state (e.g., indicating that children can get easily bored with practicing sight words) were quite rare (9% and 15%, respectively). Teachers gave a rationale for their suggestions (e.g., explaining how asking questions about books helps children's reading comprehension) in about only a third (35%) of the cases.

DISCUSSION

Parent-teacher conferences have the potential to serve as a bridge between school and home, thereby fostering parents' involvement in children learning. Despite a wealth of advice on how teachers should conduct parent-teacher conferences (e.g., García-Sánchez et al., 2011; Graham-Clay, 2005; Harvard Family Project, 2010; Price & Marsh, 1985; Simmons, 2002; Vickers et al., 2002), there is relatively little data on such conferences (for some exceptions, see Cheatham & Ostrosky, 2013; Hirsch & Altman, 1986; Minke & Anderson, 2003; Pillet-Shore, 2016). The goal of the current research was to begin to establish an empirical foundation in regards to what information teachers provide during parent-teacher conferences and if it matters for parents' involvement in children's learning. In terms of *what* teachers talk about, they spend the majority of time on children with little attention to the curriculum or parents' involvement. Teachers also spend substantially less time discussing math than literacy, adopting less of process (e.g., strategies and motivation) orientation than when they discuss literacy. In terms of whether what teachers talk about *matters*, only teachers' process orientation appeared to contribute to parents' involvement in children's learning, with such an orientation predicting heightened involvement among parents 5 months later.

What Type of Information Do Teachers Provide During Parent-Teacher Conferences?

The current research diverged from the few studies conducted to date on parent-teacher conferences, which have generally examined teachers' cultural sensitivity or interpersonal skills (e.g., Cheatham & Ostrosky, 2013; García-Sánchez et al., 2011; Pillet-Shore, 2016; for an exception, see Minke & Anderson, 2003) in that it focused on teachers' provision of information. To accurately capture this dimension of teachers' practices during parent-teacher conferences, the first conferences of the school year were audio-recorded and then coded for the information teachers provided. Consistent with the parent reports used by Minke and Anderson (2003),

information about children in the academic context constituted the bulk of information provided by teachers, which is not surprising given that parent-teacher conferences are timed to occur with the distribution of report cards (e.g., the first conference of the year coincides with the end of the first quarter at which time children receive their first report card of the year). Indeed, teachers often began conferences by taking parents through children's report cards. Although such information may be important, teachers focused on it at the expense of providing information about the curriculum and parents' involvement.

Teachers' provision of information also focused heavily on literacy, with less attention to math. The tendency for teachers to give short shrift to math was evident whether they were talking about children, the curriculum, or parent involvement. This may reflect the major emphasis on literacy during first, second, and third grade, with teachers spending a larger proportion of the day on literacy than math (Banilower et al., 2013). It is also possible that the heightened attention to literacy over math is due to elementary school teachers having less training in math than literacy (Banilower et al., 2013), which may make them less comfortable discussing the subject with parents. Moreover, almost all of the teachers in the research were women and may have internalized the stereotypes that women are not good at math (e.g., Nosek et al., 2009; Spencer et al., 1999; Steffens et al., 2010), leading to some math anxiety.

Significantly, in line with research indicating that math is often viewed among teachers (e.g., Lee & Ginsburg, 2009), as well as others (e.g., Leslie et al., 2015), as requiring innate talent, teachers' discussion of math (vs. literacy) was characterized by less of a process orientation. Specifically, for both math and literacy, the more teachers' provided information about children, the more they were both process and outcome (e.g., grades and test scores) oriented. However, the association between teachers' discussion of math was more weakly associated with their process orientation than was their discussion of literacy. The tendency for

teachers to talk less about math (vs. literacy) and be less process oriented when they did so may communicate to parents that there is less they can do to support children's math (vs. literacy) learning. Indeed, as discussed below, the higher teachers' process orientation, the more involved parents were five months later.

Surprisingly, most of the variance in the information teachers provided during parent-teacher conferences was due to whether they were talking about math versus literacy. Once this variance was taken into account, there was relatively little variance within-teachers in their conferences with different families suggesting that teachers do not adjust and tailor their information provision family to family contingent on children's or parents' characteristics (e.g., children's mastery of the work). Indeed, teachers did not generally not modulate their information provision based on children's grades in school, grade level, or gender; parents' educational attainment also did not play a modulating role. The one exception was teachers' provision of parent involvement information in regards to literacy was higher when children were younger (vs. older), which is in line with prior research finding that teachers issue more involvement invitations to parents of younger (vs. older) children (e.g., Epstein, 1986; Green et al., 2007). The tendency for teachers to provide more parent involvement information in literacy when children are younger may reflect that such involvement is generally relatively easy (e.g., read with your child regularly) and enjoyable for parents when children are younger, with much evidence that it is effective (for a review, see Bus, Van Ijzendoorn & Pellegrini, 1995). The activities with older children may not be as easy or enjoyable (e.g., suggest more challenging books for children to read independently).

When it came to teachers' process and outcome orientation, there was sizeable variance both within- and between-teachers, but the former was sizably larger. One reason there may have been more variance in these analyses was because we did not take into account the subject (i.e.,

math vs. literacy) of teachers' orientations as we coded them globally. Notably, teachers were more process oriented and less outcome oriented in talking with parents of children who were having more difficulty in school. Given that teachers' heightened process orientation predicted parents' subsequent involvement, this may be a useful strategy. However, parents of children doing well may not be developing knowledge that may help them further support their children or deal with difficulty when they encounter it. Moreover, the relatively larger focus on outcomes with parents of children doing well may lead them to place emphasis on children's performance rather than the process of learning. Interestingly, parents were also more process oriented when talking with parents of boys than girls. Although boys and girls in our study did not differ in terms of their grades, it may be that teachers felt that boys could be working harder given that they tend to be less engaged in their schoolwork, with more disruptive behavior in the classroom (e.g., Kenney-Benson, Pomerantz, Ryan, & Patrick, 2006), which may have been the focus of teachers' process orientation when discussing boys.

Does Teachers' Communication Contribute to Parents' Involvement?

A key reason for the interest in teachers' provision of information during parent-teacher conferences is that there has been speculation that it may enhance the quantity and quality of parents' involvement in children's learning (e.g., Harvard Family Research Project, 2010; Minke & Anderson, 2003; Pomerantz & Grolnick, 2016). For example, Simmons (2002) suggests that informing parents about children's learning process and recommending involvement strategies that target the needs of children during conferences could foster constructive involvement among parents. Looking at the quantity of parents' involvement, the current research found that the more teachers were process oriented, the more parents were involved in children's learning five months later. Providing an elaborated account of children's learning process may help parents to understand what their children's strengths and weaknesses are and how children can improve

(e.g., via effort or other means). Given that teachers' process orientation was less common when they were discussing children in the math context, teachers may be missing an opportunity to support parents' involvement in this area where parents are considered an underutilized resource. Although the effect of teachers' process orientation was small, the conferences were only about 15 minutes and teachers were on average only moderately process-oriented. It is possible that if (1) teachers increase their process orientation during parent-teacher conferences, and if (2) there is consistency among teachers in doing so, these small effects of each conferences may accumulate over time.

Surprisingly, the other types of information that we coded did not predict parents' involvement five months later. Information about children may have just been so high that almost every parent who attended a parent-teacher conference received a useful dose. Conversely, teachers' provision of curriculum and parent involvement information may have been so sparse that it were not useful. For example, even at relatively high levels of parent involvement information provision, it may not have been enough to build parents' feeling of efficacy in regards to supporting children's learning. Teachers did not provide any parent involvement information in 35% of the conferences and provided only a little bit of such information (e.g., as simple as "you should practice, practice, practice subtraction with him") in 52% of the conferences. In addition, the quality of parent involvement information may not have been optimal. The coding of the content of teachers' parent involvement information indicated that when they did provide such information, the large majority of the time they simply pointed parents to learning materials, often by just handing parents a list of sight words or information about a website for practicing math. Teachers also highlighted practices or drills as a key method of improvement about half the time, but rarely discussed what to do when children pushed back on these often tedious activities. Teachers did explicitly tailor their advice to children's problems

in their conferences with 40% of families to which they provided involvement information. However, tailored suggestions to children's interests or personality or suggested autonomy-supportive practices, which may be crucial for increasing children's receptiveness to parents' involvement, were quite rare. Indeed, parents' involvement may not be effective if implemented without considering issues of sensitivity to children (e.g., Pomerantz, Wang & Ng, 2005).

Limitations and Future Directions

The current research takes a step toward establishing an empirical foundation on teachers' practices during parent-teacher conferences, but is characterized by several limitations that future research should address. First, participating teachers and families may reflect a select group. Only half of the teachers who were invited to take part in the study participated, despite repeated recruitment attempts. These teachers may have felt confident in their abilities to conduct parent-teacher conferences and thus been particularly skilled. In line with this, one teacher in her first year of teaching said she decided not to participate because she was trying to work out how to do the conferences. Conversely, teachers who felt that the parent-teacher conference is a particularly private and useful time may have opted out. In terms of families, only approximately a third to a half of them allowed their conferences to be audio-taped, with teachers discouraging families of children in Individualized Education Programs (IEPs) from participating, because they felt the information should be private. Even fewer families completed the survey on their involvement in children's learning. Ultimately, there may have been a restricted range on both the side of teachers and parents, as well as limited power. In addition, we were able to obtain grades from schools for only 72% of the sample, which may have been one reason we did not find that teachers' communications predicted heightened involvement among parents with children doing poorly in school.

A second limitation of the current research is that there is insufficient information to unpackage the relation between teachers' information provision and parents' involvement. Parents' initial involvement in children's learning before the conferences was not assessed, and therefore could not be taken into account in the analyses. Thus, for example, one reason that teachers' process orientation may have predicted involvement among parents is because more involved parents asked more questions about children's learning given their heightened motivation and knowledge. In addition, we did not assess the quality of parents' involvement such as whether it was autonomy supportive or controlling. The examination of the content of parent involvement information provided by teachers suggests that lack of enhancing effects of teachers' parent involvement information may reflect the quality of such information, which may have led parents to use ineffective strategies. Last, it was not possible to look at whether different types of teachers' parent involvement information are more predictive of parent's later involvement. Teachers provided parent involvement information quite infrequently, making it difficult to conduct multilevel analyses with each type of parent involvement information, which also occurred infrequently.

Third, although an important aspect of parent-teacher conference is the sensitivity (e.g., responsiveness) of teachers (Graham-Clay, 2005; Harvard Family Research Project, 2010; Pilet-Shore, 2016; Price & Marsh, 1985; Simmons, 2002; Vickers, Minke, & Anderson, 2002), the current study did not examine this aspect. Many parents feel intimidated and anxious about parent-teacher conferences, as they view it as a place where their children and parenting are judged by teachers (Lawrence-Lightfoot, 2004; Minke & Anderson, 2003). However, when teachers are sensitive to parents' needs and supportive of parents' ideas and questions, parent-teacher conferences have the potential to be a fruitful place where parents and teachers learn about children from one another and collaborate to work toward goals that optimize children's

well-being (Minke & Anderson, 2003; Vickers, Minke & Anderson, 2002). We attempted to code the audio-recordings in terms of teachers' affect and sensitivity, but it was challenging for a variety of reasons. For one, teachers almost never expressed negative affect toward parents, making it difficult to define and code variation in teachers' affect and sensitivity. In addition, without video-recordings, it was not possible to obtain essential information such as facial expressions and body language that reflect teachers' sensitivity. Thus, although video-recordings of parent-teacher conferences may be more intrusive than audio-recordings, likely yielding an even more select sample of teachers and parents, they may be key in understanding teachers' sensitivity during parent-teacher conferences.

Conclusions

Although there is much advice on how teachers should conduct parent-teacher conferences (e.g., García-Sánchez, Orellana, & Hopkins, 2011; Graham-Clay, 2005; Harvard Family Project, 2010; Price & Marsh, 1985; Simmons, 2002; Vickers, Minke, & Anderson, 2002), there is a paucity of empirical evidence on which to base such advice. Using audio-recordings, the current research found that teachers largely focus on children during parent-teacher conferences, with relatively little discussion of the curriculum or parent involvement. Notably, the more teachers were process oriented, the more involved parents were five months later. Surprisingly, teachers' provision of parent involvement information did not predict parents' involvement, likely due to the sparsity of such information, particularly in terms of issues of quality. In addition, teachers focused significantly less on math than literacy, adopting less of a process orientation for math. Although additional research is needed to advise and train teachers, findings from the current research suggest that training to optimize parent-teacher conferences as a bridge between home and school would be constructive.

TABLES AND FIGURES

Table 1

Coding Scheme for Teachers' Communications

Dimension	Definition	Examples
Information		
Child	Information about children in the academic context (e.g., progress in developing a skill over time or behavior during instruction)	Math: "Her scores were perfect on the math assessment." Literacy: "She has trouble with comprehension."
Curriculum	Information on the types of problems, assignments, or activities children do, as well as expectations and standards for children's skill development or performance	Math: "We do timed tests for basic mathematical operations." Literacy: "By the end of the year, we expect children to be reading these kinds of chapter books."
Parent Involvement	Suggestions for parents about the use of specific practices or resources; explanations of the benefits of practices or resources	Math: "You can use this website that gives quizzes on subtraction." Literacy: "You can have him do just five minutes of independent reading a day."
Orientation		
Process	Provision of specifics about children's skills, strategies, motivation, or behavior (e.g., effort); explanations for children's success or difficulty	"His math is not as good as it could be because he is easily distracted by other children." "She is having a hard time recognizing sight words, which is slowing down her reading progress."
Outcome	Reference to performance indicators such as grades, test scores, or attainment of particular standards or levels	"He got a 76 on the math test." "She is reading quite a bit above grade level."

Note. Child, curriculum, and parent involvement codes were made for math and literacy separately; the process and outcome orientation codes were made globally, across the two subjects. All ratings were made on a 5-point scale (1 = *Not at all – never*, 5 = *Very much – very frequently*).

Table 2

Teachers' Provision of Child, Curriculum, and Parent Involvement Information

Model parameters	Child Information		Curriculum Information		Parent Involvement Information	
	Empty Model	Subject Comparison	Empty Model	Subject Comparison	Empty Model	Subject Comparison
	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef. (SE)
Fixed effects						
Intercept (γ_{000})	2.67 (.05)***	3.07 (.06)***	1.56 (.04)***	1.76 (.05)***	1.50 (.04)***	1.68 (.05)***
Subject slope (γ_{100}). (math = 1, literacy = 0)	-	-.80 (.07)***	-	-.40 (.04)***	-	-.35 (.04)***
Random effects						
Level-1 error (e)	.66 (.03)	.43 (.02)	.39 (.02)	.31 (.02)	.36 (.02)	.30 (.02)
Intercept variance at Level-2 (r_0)	.00 (.00)	.07 (.01)***	.06 (.01)***	.10 (.02)***	.05 (.01)***	.08 (.01)***
Intercept variance at Level-3 (u_{00})	.09 (.04)***	.10 (.04)***	.04 (.03)***	.04 (.03)***	.07 (.04)***	.07 (.04)***

*** $p < .001$.

Table 3

Associations Between Child Information and Process and Outcome Orientations

	Child Information	
	Math	Literacy
Orientation	Slope Coef. (SE)	Slope Coef. (SE)
Process	$.14_a$ (.07)	$.45_b$ (.05)
Outcome	$.14_a$ (.05)	$.21_a$ (.03)

Note. Coefficients with different letter subscripts within the same row are significantly different ($p < .001$) from each other. The estimates are based on the MLMs.

Table 4

Content of Teachers' Parent Involvement Information

Involvement categories	Definition	Examples	Mean frequency per family (*SD*)	% of families receiving type of information at least once (*n* = 278)
Practice type				
Provision of materials	Provision of materials or resources that child can work on for learning and development	Math worksheets, a website that can help child with vocabulary, a list of discussion questions to ask child after reading a book	1.13 (1.17)	67%
Practice	Highlighting practices or drills as a way to improve on an area of learning	Telling parent child needs more practice on sight words	.66 (.91)	44%
Parent persistence	Explicitly telling parent that parent has to persist and keep encouraging child	Telling parent to keep encouraging child to go through subtraction problems until child can easily solve them	.18 (.45)	16%
Rewards	Suggesting rewarding as a way to guide child	Giving a star sticker every time child does well on homework and tests	.02 (.15)	2%
Punishment	Suggesting punishing as a way to guide child	Limiting TV time when child refuses to do math homework	0 (.06)	0%
Practice quality				
Autonomy support	Suggesting child-centered involvement that permits child choice—even if it is limited	Letting child choose which books to read or when to do homework	.11 (.35)	9%

Table 4 (cont.)

Acknowledgement of child's negative state	Acknowledging that children can be frustrated, upset, bored, uninterested, or in another negative state while doing work	Telling parent children can be bored when going over the same concept repeatedly; acknowledging that not being able to understand books because of vocabulary issues can be frustrating	.16 (.42)	15%
Advice tailored to child's problem(s)	Involvement information that is explicitly connected to child's struggles	Telling parent that child needs to work on subtraction problems, as most of the missed questions for a math quiz were on subtraction	.52 (.75)	40%
Advice tailored to child's interest and personality	Involvement information that is tailored to child in terms of child's interest and personality	Suggesting an activity that is not sedentary for a child, because teacher knows the child is very active	.13 (.37)	11%
Rationale	Explaining the mechanism of how the involvement is going to help child	Explaining how asking questions about books would help with child's reading comprehension; telling parents why a math website is useful for child's math learning	.46 (.73)	35%
Other	Parent involvement information that does not fit into any of the categories defined		.25 (.52)	22%

Note. Involvement information could be coded into multiple categories (e.g., if teacher provided a material and emphasized practicing the material at the same time, such information could be coded as *provision of materials* and *practice*).

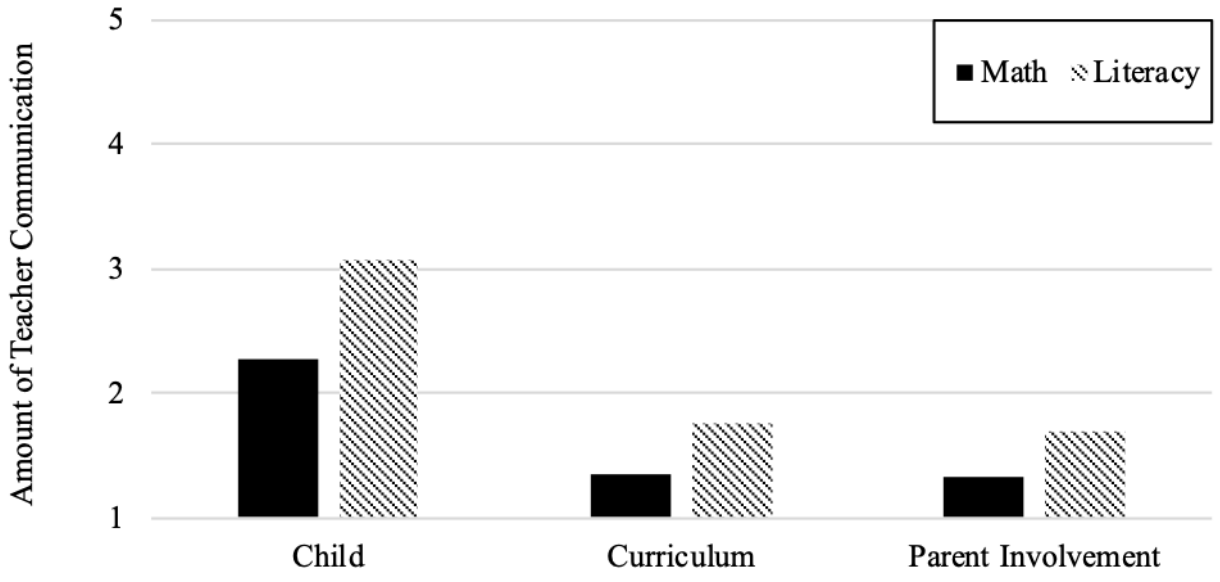

Figure 1. Teachers' provision of child, curriculum, and parent involvement information for math and literacy. *Note.* Ratings were made on a 5-point scale (1 = *Not at all – never*, 5 = *Very much – very frequently*). The estimates are based on the MLMs.

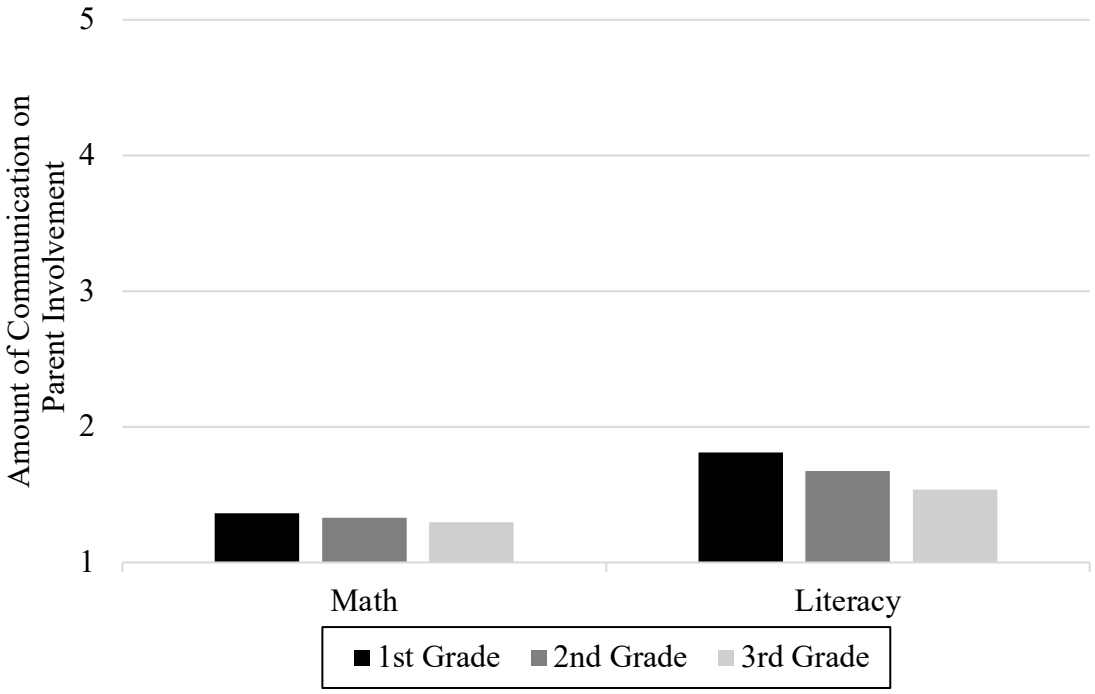

Figure 2. Teachers' parent involvement information for math and literacy by children's grade level. *Note.* Ratings were made on a 5-point scale (1 = *Not at all – never*, 5 = *Very much – very frequently*). The estimates are based on the MLMs.

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APPENDIX A: ADDITIONAL TABLES

Table 5

Example Multilevel Models Predicting Child, Curriculum, and Parent Involvement Information

Level	Model 1	Model 2	Model 3	Model 4	Model 5
Level-1	Child Information$_{ij}$ = π_{0jk} + e_{ijk}	Child Information = π_{0jk} + π_{1jk}*(Subject$_{ijk}$) + e_{ijk}	Child Information = π_{0jk} + π_{1jk}*(Subject$_{ijk}$)	Child Information = π_{0jk} + π_{1jk}*(Subject$_{ijk}$) + e_{ijk}	Child Information = π_{0jk} + π_{1jk}*(Subject$_{ijk}$) + e_{ijk}
Level-2	$\pi_{0jk} = \beta_{00k} + r_{0jk}$	$\pi_{0jk} = \beta_{00k} + r_{0jk}$ $\pi_{1jk} = \beta_{10k}$	$\pi_{0jk} = \beta_{00k} + \beta_{01k}$*(Process Orientation$_{jk}$) + r_{0jk} $\pi_{1jk} = \beta_{10k} + \beta_{11k}$*(Process Orientation$_{jk}$)	$\pi_{0jk} = \beta_{00k} + r_{0jk}$ $\pi_{1jk} = \beta_{10k}$	$\pi_{0jk} = \beta_{00k} + \beta_{01k}$*(Family Characteristic$_{jk}$) + r_{0jk} $\pi_{1jk} = \beta_{10k} + \beta_{11k}$*(Family Characteristic$_{jk}$)
Level-2	$\beta_{00k} = \gamma_{000} + u_{00k}$	$\beta_{00k} = \gamma_{000} + u_{00k}$ $\beta_{10k} = \gamma_{100}$	$\beta_{00k} = \gamma_{000} + u_{00k}$ $\beta_{01k} = \gamma_{010} + u_{01k}$ $\beta_{10k} = \gamma_{100}$ $\beta_{11k} = \gamma_{110} + u_{11k}$	$\beta_{00k} = \gamma_{000} + \gamma_{001}$(Grade Level$_k$) + u_{00k} $\beta_{10k} = \gamma_{100} + \gamma_{101}$(Grade Level$_k$)	$\beta_{00k} = \gamma_{000} + u_{00k}$ $\beta_{01k} = \gamma_{010} + u_{01k}$ $\beta_{10k} = \gamma_{100}$ $\beta_{11k} = \gamma_{110} + u_{11k}$

Table 6

Example Multilevel Models Conducted for Predicting Parents' Involvement in Children's Learning

Level	Model 1	Model 2
Level-1	Parent Involvement$_{ij}$ = β_{0j} + β_{1j}*(Child Information$_{ij}$) + r_{ij}	Parent Involvement$_{ij}$ = β_{0j} + β_{1j}*(Child Grades$_{ij}$) + β_{2j}*(Child Information$_{ij}$) + β_{3j}*(Child Information × Child Grades$_{ij}$) + r_{ij}
Level-2	$\beta_{0j} = \gamma_{00} + u_{0j}$ $\beta_{1j} = \gamma_{10} + u_{1j}$	$\beta_{0j} = \gamma_{00} + u_{0j}$ $\beta_{1j} = \gamma_{10} + u_{1j}$ $\beta_{2j} = \gamma_{20} + u_{2j}$ $\beta_{3j} = \gamma_{30} + u_{3j}$